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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/914,456	08/28/2001	Jaydeep Sinha	ADE-066XX	5339

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EXAMINER	
KIBLER, VIRGINIA M	
ART UNIT	**PAPER NUMBER**
2623	

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/914,456	SINHA ET AL.	
	Examiner	Art Unit	
	Virginia M Kibler	2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-30 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-30 is/are rejected.

7)☒ Claim(s) 2,4,10-13,16 and 27-30 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 28 August 2001 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 8/28/01,4/07/03.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

2. The drawings are objected to because Figures 2 and 3 are not clear. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the

changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: "magnitude that" should be changed to "magnitude than" on page 2, line 2.

Appropriate correction is required.

Claim Objections

4. Claims 2, 4, 10-13, 16, and 27-30 are objected to because of the following informalities:

"proscribed" should be changed to "prescribed" in claim 2, line 2;

"special" should be changed to "spatial" in claim 4, line 2;

"spacial" should be changed to "spatial" in claim 10, line 3;

"for the generating" should be changed to "for generating" in claim 11, line 1;

"function said" should be changed to "function of said" in claim 11, line 8;

"spacial" should be changed to "spatial" in claim 16, line 2;

"square" should be changed to "squares" in claim 27, line 7; and

"proscribed" should be changed to "prescribed" in claim 30, line 2.

Claims 12 and 13 depend on claim 11, and are thereby objected to.

Claims 28 and 29 depend on claim 27, and are thereby objected to.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-9, 11-21, 23-26, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Williams et al. (US 6,199,986).

Regarding claims 1 and 14, Williams et al. ("Williams") discloses receiving noisy data as a vector, each element of which corresponds to one sample point (Col. 19, lines 18-67; Col. 21, lines 13-67, Col. 22, lines 13-67; Col. 10, lines 6-49); and calculating coefficients of a polynomial which converts said noisy data vector to a 2D function continuously representing the artifact in the 2D space (Col. 21, lines 13-67, Col. 22, lines 1-24; Col. 19, lines 32-48).

Regarding claims 2 and 30, Williams discloses the sample points lack regular geometrically prescribed locations on specimen (Figure 6).

Regarding claims 3 and 15, Williams discloses a non-rectilinear specimen (Abstract).

Regarding claims 4 and 16, Williams discloses sample points having a sufficiency to represent the spatial frequency of the noise to be reduced (Col. 11, lines 45-67, Col. 12, lines 1-5).

Regarding claims 5 and 17, Williams discloses using Zernike polynomials (Col. 21, lines 66-67, Col. 22, lines 1-24).

Regarding claims 6 and 18, Williams discloses the calculated coefficients are fewer in number than the number of sample points (Col. 10, lines 27-49).

Regarding claims 7 and 19, Williams discloses the noisy data is obtained using a measuring apparatus (Col. 19, lines 18-31) and the calculating step includes the step of mathematically multiplying the data vector by a matrix representing a least squares fit between the data vector and the polynomial (Col. 21, lines 13-67, Col. 22, lines 1-24).

Regarding claims 8 and 20, Williams discloses the matrix is a singular value decomposition (Col. 21, lines 13-67, Col. 22, lines 1-24).

Regarding claims 9 and 21, Williams discloses calculating specimen spatial artifacts from said polynomial for one or more points in 2D space (Col. 19, lines 18-67).

Regarding claims 11 and 23, Williams discloses receiving data representative of artifacts in 2D space of a specimen obtain by a measurement apparatus, each data point associated with a data position (Col. 19, lines 18-67; Col. 21, lines 13-67, Col. 22, lines 13-67; Col. 10, lines 6-49); and calculating a specimen-independent noise compensating matrix as a function of said data position in 2D space of said specimen (Col. 21, lines 13-67, Col. 22, lines 1-24; Col. 19, lines 32-48).

Regarding claims 12 and 13, the arguments analogous to those presented above for claims 7 and 5 are applicable to claims 12 and 13, respectively.

Regarding claim 24, the arguments analogous to those presented above for claim 7 are applicable to claim 24.

Regarding claim 25, Williams discloses the matrix is of the form of a multiplier of a Zernike polynomial without decomposition coefficients (Col. 10, lines 6-49).

Regarding claim 26, Williams discloses a computer for calculating coefficients (Col. 16, lines 5-62).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 10 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US 6,199,986) as applied to claims 9 and 21 above.

Regarding claims 10 and 22, Williams discloses using a computer (Figure 3), but does not appear to specify transmitting coefficients to a remote location prior to the calculation of spatial artifacts from the polynomial. However, this well known in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the invention disclosed by Williams to include transmitting data to a remote location. The motivation for doing so would have been because it is a well known methodology routinely implemented in the art. Therefore, it would have been obvious to modify Williams to obtain the invention as specified in claims 10 and 22

9. Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams et al. (US 6,199,986) in view of Evans et al. (US 5,739,906).

Regarding claim 27, Williams discloses obtaining a set of noisy data points (Col. 19, lines 18-67; Col. 21, lines 13-67, Col. 22, lines 13-67; Col. 10, lines 6-49); using a complete set of Zernike polynomials as a shape functional space (Col. 19, lines 17-67); applying a weighted least squares fit between said noisy data points and a set of data points calculated from Zernike polynomials; and finding decomposition coefficients (Col. 21, lines 13-67, Col. 22, lines 1-24). Williams does not disclose determining wafer shape. However, Evans et al. ("Evans") teaches that it is known to obtain data representing a wafer shape and use a complete set of Zernike polynomials as a shape functional space (Col. 7-10). Williams and Evans are combinable because they are from a similar problem solving area of wavefront aberration. At the time of the invention, it would have been obvious to one of ordinary skill in the art to have modified the specimen used by Williams to include a wafer. The motivation for doing so would have been because it is well known in the art and would expand the versatility of the system to encompass wafers. Therefore, it would have been obvious to combine Williams with Evans.

Regarding claim 28, Williams discloses decomposition coefficients associated with Zernike polynomials (Col. 21, lines 13-67, Col. 22, lines 1-24), thereby having a compact data representation. The arguments analogous to those presented above for claim 27 are applicable to claim 28.

Regarding claim 29, Williams discloses a set of noisy data points from a scanning pattern that is not necessarily evenly spaced (Col. 9, lines 49-67, Col. 10, lines 1-5).

Other Prior Art Cited

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Pat. No. 5,966,243 to Braunecker et al. for correcting wave front deformations;

U.S. Pat. No. 5,978,085 to Smith et al. for data analysis for correction of optical system;

U.S. Pat. No. 5,986,760 to Nakayama et al. for shape measurement and high-precision lens manufacturing process;

U.S. Pat. No. 6,086,204 to Mangante for design and fabricate surfaces on contact lenses and on corneal tissue that correct the eye's optical aberrations; and

U.S. Pat. No. 6,341,183 to Goldberg for image acquisition.

Contact Information

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Virginia M Kibler whose telephone number is (703) 306-4072. The examiner can normally be reached on Mon-Thurs 8:00 - 5:30 and every other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Virginia Kibler can be reached on (703) 306-4072. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Virginia Kibler
12/11/04

MEHRDAD DASTOURI
PRIMARY EXAMINER